

LIP PRINTS AND BLOOD GROUPS, AMONG TWO SOUTH INDIAN POPULATION- AN IN-VIVO STUDY

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ABSTRACT

Collection and classification of lip print, from the crime scene has an important role, in identification of the person in forensic dentistry. Studies have shown that, different racial and ethnic groups show differences in the predominant lip print pattern.

Aim:

To study the lip print pattern in relation to gender, geography and ABO blood group and Rh system

Materials and Methods:

A cross- sectional study was done by purposive sampling. The sample size was 100 [50 from Kerala and 50 from Karnataka], each group in turn comprise of 25 males and females. After applying lipstick evenly, lip print was obtained, by dabbing a strip of cellophane tape and classified, as per Tsuchihashi's system. The data was analyzed and expressed in proportions and chi-square test, for statistical significance was used.

Results:

Type IV (32%), followed by Type II (30%) were the commonest lip pattern observed. Type IV was commonly found, both in Kerala and Karnataka group followed by Type II and type I. This was statistically significant at p value of 0.5 ($X^2=3.06$ df:4 p=0.5. Males had Type IV (42%) has the commonest pattern and females had Type II (28%), however the differences was not significant statistically (. $X^2=16.8$ at df:4 p=0.001). Type IV and Type II pattern is seen in almost all the blood group, except in AB-ve and B-ve individuals. Type I pattern found, in Rh- positive blood group only.

Conclusion

Difference in lip pattern was observed in relation to geography, but not with gender and ABO blood group.

KEYWORDS: Forensic Dentistry, Lip Print, Gender And ABO Blood Group & Rh System

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INTRODUCTION

Forensic sciences refer to the area of endeavor that can be used, in a judicial setting and accepted by the court and the general scientific community, to separate truth from untruth¹. Personal identification is an integral part of forensic investigations.^{1,2} for the same, DNA proofing and fingerprints are the most commonly used tools.³

⁴ But, these evidences are not ubiquitous and may not necessarily be obtained, from the crime scene. In such a scenario, the mouth allows for a myriad of possibilities, for forensic identification.⁴

The lip prints are similar to finger prints, pallor prints and foot prints. Lip prints are formed as early as 6th week of uterine life. Since then, lip patterns hardly ever modify. So, lip prints can be used for human identification.^{4,5} A comparison of lip prints, from the crime scene and those obtained from the suspects, may be useful in the identification or narrowing down the investigation. The study of these grooves or furrows present, on the red part or the vermilion border of the human lips is known as cheiloscopy.⁵ This phenomenon was first noted, by anthropologists. R. Fischer was the first, to describe it in 1902.⁵ Yasuo Tsuchi-hashii, in 1974 classified the lip prints into six types, based on shape and way of the grooves.

One more biological record that remains unchanged, throughout the life time of a person is the blood group. Determining the blood group of a person, from the samples obtained at the site of crime, helps in identifying a person. Landsteiner classified blood groups under the ABO blood group system.^{5,6} The use of lip prints and finger prints is of paramount importance, since doing a personal identification by other means, such as DNA analysis is sophisticated and they are not available in rural and developing countries.^{6,7,8}

In India, various studies have shown that, different racial and ethnic groups show differences in the predominant lip print pattern, suggesting of population-wise dominance. Hence, the aim of the present study was, to evaluate and compare the lip print pattern and blood group, among Karnataka and Kerala population of India.

MATERIALS AND METHODS

Study Type

Hospital based cross- sectional study.

Study Setting

Department of Dentistry, Hassan Institute of Medical sciences, Hassan

Study Period

7/06/2016 to 6/08/2016

Study Population

All subjects (students), studying medical and nursing in Hassan with family origin from Kerala and Karnataka, were included in the study. There were about 200 students from Kerala and 200 from Karnataka, among them 50% of the students were selected, based on the inclusion and exclusion criteria.

After taking prior informed written consent, participants were selected by purposive sampling. All individuals were aged between 18-24 years, whose lips were normal and free of any disease, were included in the study. Individuals with known hypersensitivity to lipsticks, with any scar or any other abnormality of the lip, were excluded from the study.

Study Tools

Bond paper, oil free lipstick, lipstick applying brush and magnifying glass with light.

Method of Data Collection

The subjects were asked to clean the lips, with wet cotton and dried. Then, lipstick was applied in a single direction evenly, on the lips. The subjects were asked to gently rub his/ her lips together, to spread the lipstick evenly.

A strip of cellophane tape, 10cm long was cut with scissors. The subjects were asked to open the mouth slightly, and to keep the mouth stationary, during the procedure. The glued portion of the cellophane tape was applied, on the lower lip. It was held in place, applied tape was carefully lifted from the lip, from one end to the other, avoiding any smudging of the print. The strip of the cellophane was pasted on white bond paper, to create a permanent record with a serial number. The middle one cm of lower lip was the area to be studied, as this is the part most frequently found, at a crime scene. Thus, this portion was considered in this study. Then, with the help of magnifying lens the predominant type of grooves, in the central portion was noted and the grooves were classified according to classification, given by Suzuki and Tsuchihashi from types I to type V. Blood group of each individual was documented, as reported by the study participants.

Suzuki and Tsuchihashi's⁶ classification as:

Type I: Complete vertical

Type II: Incomplete vertical pattern

Type III: Branching or Y Pattern

Type IV: Reticular pattern

Type IV: All other pattern

The lip print was analyzed, only by considering the pattern present in the central portion of the lip. The frequency of each type of lip print was tabulated, and the percentage and proportion of each type was calculated.

Inclusion Criteria

- Participants with family origin from Karnataka or Kerala
- Participants who gave consent voluntarily.

Exclusion Criteria

- Individuals with known hyper sensitivity to lipstick
- Individuals with lip infections
- Individuals who have undergone surgical correction or scars on lip.
- Not willing to participate.

RESULTS

Among the types of lip prints, Type II (34%) was commonest lip pattern observed, followed by Type IV (33%) and Type I (12%). Lip pattern of Type IV and Type II were commonest among Karnataka and Kerala students, respectively, followed by Type II, Type I in both the population. Type-I' pattern was more commonly found among Karnataka population (12%), compared to Kerala (8%) population. This difference was statistically significant (Table 1). On gender wise comparison of lip print pattern, Type IV was more common (42%) among males, followed by Type II, Type III and Type I. Among females, Type II (34%) was more common, followed by Type IV, Type I, and Type III. Lip pattern of Type I (20%) was seen more among females than males. However, the difference in lip pattern observed between the genders was not statistically significant (Table 2). Analysis of blood group revealed that, A+ve (33%) was

common blood group among the study population, followed by B+ve and O+ve (Table-3). On correlation of lip pattern and blood group, Type IV and Type II pattern was seen in almost all blood group individuals, except in AB+ve and B-ve individuals. Type I pattern was seen in Rh positive blood group only (AB+ve, A+ve and B+ve) (Table-3).

DISCUSSIONS

There are a few traits that identify an individual. These range from precise molecular DNA typing to macroscopic structures, like finger prints and lip prints.^{8,9} For a physical characteristic to be used as an identification marker, it should be unique and permanent. Finger prints, lip prints and blood groups are biological characteristics, that are persistent from birth to death of an individual.¹⁰ The aim of the present study was, to evaluate and compare the lip print pattern and blood group, among Karnataka and Kerala population of India.

Lip prints are very useful in forensic investigation and personal identification. They are considered to be most important forms of transfer evidence, and are analogous to finger prints. Lip prints are usually left at crime scenes, and can provide a direct link to the suspect. In recent years, lipsticks have been developed, that do not leave any visible trace after contact with surfaces such as glass, clothing, cutlery, or cigarette butts. These lip prints are characterized by their permanence and are, therefore, referred to as 'persistent' lip prints.^{9,10} Although invisible, these prints can be lifted using materials, such as aluminum powder and magnetic powder.¹⁰ Apart from lipsticks, dyes like Nile red have been used to obtain lip imprints. These dyes are visualized under ultraviolet or blue light.¹¹

Also, the use of lipsticks is not indispensable for leaving lip prints. The edges of the lips have sebaceous glands, with sweat glands in between. Thus, secretions of oil and moisture from these, enable development of 'latent' lip prints, analogous to latent finger prints.¹¹ Eventhough, the lines and furrows are present, both in the upper lip and lower lip from one corner of the mouth to the other corner, only the middle portion in the lip is taken into account, since this portion is always visible in any traces.¹² Lip prints may appear in various patterns like vertical, horizontal intersecting and branching.

In the present study, Type IV was the most common lip pattern seen, followed by Type II, Type I, Type III and Type I. Khanapuri et al, also observed the similar results.¹² Type III was the commonest among Indo-Dravidian population.¹³ Manikya et al., found Type II to be more predominant.¹⁴ Srilekha et al., observed Type I to be the commonest, followed by Type IV.¹⁵ Comparative study done on Kerala and Maharashtra sub population, by Ashwinirani et al¹⁶ revealed that, Type IV (53%) was commonest lip pattern observed in Kerala population, followed by Type III (19%). In Maharashtra's sub-population, Type II was the commonest followed by Type II. Sneha et al.,¹⁷ in their study found that, Type IV was commonest followed by Type II, among Kerala population and in Karnataka population, it was Type II followed by Type III. However, the association between geographic location and lip print was not significant. Among Rajasthan population, Type II was commonest followed by Type III and Type I. Lip patterns of Type IV and Type V was the rarest.¹⁸

In the present study, the pattern of lip prints among the gender showed, Type IV to be most common among males, followed by Type II. Among females, the commonest was Type II followed by Type I and Type IV. Similar observations were made by Khanapuri et al, and found a statistically significant association between gender and lip pattern. Sharma, et al¹⁹ found Type IV was predominant in male and Type I and Type I' were commonest pattern in females. But, Srilekha et al., found Type I and Type IV were equally predominant in males and Type I, in females. Ashwinirani et al., found Type II to be commonest among males, followed by type IV and in females Type IV was most common, followed

by Type II. Verma et al., noted that Type II was most common, followed by Type III in males and in females Type II was the commonest, followed by Type III.¹⁸

Blood groups are biological records that remain unchanged throughout the life time of an individual²⁰. The overall commonest blood group, found in our study was A+ve followed by B+ve and O+ve. But, in India, O+ve is the commonest blood group, followed by B+ve. Among Rajasthan's population, B+ve was the most common.¹⁵ Ashwinirani et al., also found B+ve to be the most common blood group, in their study population.

On correlating lip pattern and blood group, we found, Type IV lip pattern were predominant in A+ve blood group, Type II in O+ve and B+ve blood group individuals. Equal predominance of Type IV, Type II and Type I was found in AB +ve blood group individuals. Verma P et al., found that, frequency of Type I, Type I', Type II, Type III were more among B+ve group. Distribution of Type IV lip pattern was equal, among A+ve, O+ve, while Type V showed increased expression among A+ve blood group.¹⁸ Ashwinirani et al., found subjects with A+ve and O+ve blood groups had Type II lip print, in predominance and subjects, with B+ve, AB+ve and O+ve blood group, had Type IV in predominance. However, they did not find any correlation between lip prints and ABO blood group. Srilekha et al., observed that, Type I were predominant in O+ve group; Type IV and Type I equally predominant in B+ve group. Whereas, A+ve group individuals had Type IV predominant pattern. But, the correlation of lip print and blood group was not statistically significant.¹⁵

The results of the present study confirmed the distinctiveness of cheiloscropy and confirmed that, it varies among the race and ethnicity. Our study provides a baseline data, for future studies in cheiloscropy. Further work on the larger sample size, can help to make cheiloscropy a practical reality, at the ground level of the forensic identification process.

CONCLUSIONS

The study confirmed the distinctiveness of cheiloscropy and found statistically significant relation, with race and ethnicity, but disapproves any statistical association of lip print pattern with gender and ABO blood group.

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Conflict of Interest: None

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Table 1: Lip Print and Geography

Lip Print Pattern	Geography		Total(%)
	Karnataka (%)	Kerala (%)	
Type I	7 (14%)	5 (10%)	12(12%)
Type I'	6 (12%)	4 (8%)	10(10%)
Type II	15 (30%)	19 (38%)	34(34%)
Type III	6 (12%)	5 (10%)	11(11%)
Type IV	16 (32%)	17 (34%)	33(33%)
Type V	00 (00%)	00 (00%)	00(00%)
Total	50 (100%)	50 (100%)	100(100%)

$X^2 = 3.06$ $df: 4$ $p=0.5$ Statistically significant

Table 2: Lip Print and Gender

Lip Print Pattern	Gender		Total (%)
	Male (%)	Female (%)	
Type I	02 (4%)	10 (20%)	12(12%)
Type I'	00 (00%)	10 (20%)	10(10%)
Type II	17 (34%)	17 (34%)	34(34%)
Type III	10 (20%)	01 (02%)	11(11%)
Type IV	21 (42%)	12 (24%)	33(33%)
Total	50 (100%)	50 (100%)	100(100%)

$X^2 = 16.8$ at $df:4$ $p=0.001$ Statistically not significant

Table 3: Blood Group and Lip Print Pattern Distributions

Blood Group	Lip Print Pattern					Total
	Type I	Type I'	Type II	Type III	Type IV	
AB ⁺	02	-	02	01	04	09(09%)
AB ⁻	-	-	-	01	-	01(01%)
O ⁺	-	-	12	03	08	23(23%)
O ⁻	-	-	-	-	02	02(02%)
A ⁺	07	05	08	03	10	33(33%)
A ⁻	-	-	01	-	02	03(03%)
B ⁺	03	04	11	03	07	28(28%)
B ⁻	-	01	-	-	-	01(01%)
Total	12(12%)	10(10%)	34(34%)	10(10%)	34(34%)	100(100%)

